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Heat exhaustion is the most common heat illness, among soldiers and athletes. This manuscript is written in an "ask the expert" format, per request of the journal editor, to describe heat exhaustion for the athlete and practitioner. This manuscript describes the signs/symptoms, physiological cause, treatment, and measures which can be taken to prevent heat exhaustion.			
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22a. NAME OF RESPONSIBLE INDIVIDUAL Lawrence E. Armstrong, Ph.D.		22b. TELEPHONE (Include Area Code) (508) 651-4873	22c. OFFICE SYMBOL SGRD-UE-HR

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Q: What is the most common form of heat illness among athletes? Can it be prevented?

A: Although heatstroke is the third leading cause of death among young athletes, heat exhaustion is observed 8 - 12 times more often than heatstroke, and does not result in death. By definition, heat exhaustion is the "inability to continue exercise in a hot environment", and primarily results from sweat loss and/or inadequate fluid intake. When continuous exercise is performed in a hot environment, skin blood flow (important to the dissipation of heat from skin to the air) decreases and approximately 80 % of cardiac output is pumped to exercising muscles; this results in increased heat storage. When dehydration (especially greater than 3 % of body weight) is superimposed on exercise-heat stress, the cardiovascular system is simply unable to pump sufficient blood to meet all of the body's needs (e.g. skin and muscle). Signs and symptoms of heat exhaustion may include any or all of the following: profuse sweating, "heat sensations" on the head/shoulders/chest, weakness, "rubbery" legs, chills or gooseflesh on the neck and shoulders, anxiety,

irritability, slight confusion, upper body swaying, nausea, vomiting, muscle cramps and fainting. When there is doubt about the seriousness of heat illness, patients should be treated as though they have heatstroke (a medical emergency). Treatment for heat exhaustion consists of rest in a cool environment, elevation of legs, pouring cool water on the skin, and replacement of fluids orally (conscious, mild cases) or intravenously (severe cases). Recovery is usually complete within 12 - 48 hours, without further complications. Heat exhaustion may be prevented by proper heat acclimatization; consuming water, electrolytes, and carbohydrates to replace losses; and monitoring ambient conditions (temperature and humidity) to allow practice sessions to be tailored to the environment.

#### Suggested Reading

1. Armstrong LE. Signs and symptoms of heat exhaustion during strenuous exercise. Annals Sports Med. 3:182-189,1987.
2. Callahan ML. Emergency Physician Series. Emergency Management of Heat Illness. Chicago: Abbott

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Laboratories, 1979.

3. Knochel JP. Dog days and siraisis: how to kill a football player. J. Am. Med. Assoc. 233:513-516,1975.